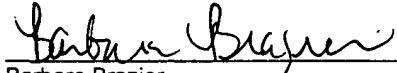


JCO6 Rec'd PCT/PTO 26 SEP 2005

#7

CERTIFICATE OF MAILING

I hereby certify that this **RESPONSE TO COMMUNICATION**) is being deposited with the United States Postal Service as first class mail in an envelope addressed to: MAIL STOP PCT, Commissioner of Patents, P.O. Box 1450, Arlington, VA 22313-1450 on this 23rd day of September, 2005.


Barbara Brazier

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S) : Willibald Kraus
FOR : **CLOSURE COVER**
SERIAL NO. : 10/518,805
INTERNATIONAL FILING DATE : June 5, 2003
EXAMINER : Unknown
ART UNIT : Unknown
CONFIRMATION NO. : Unknown
ATTORNEY DOCKET NO. : TRWZ 2 00280

RESPONSE

MAIL STOP PCT

Commissioner for Patents
P. O. Box 1450
Arlington, VA 22313-1450
Attn.: Office of PCT Legal Administration

Dear Sir:

Responsive to the Communication mailed August 31, 2005, applicant submits below an explanation and documentation regarding the sole inventor's name.

The Declaration which was submitted on July 20, 2005 listed the sole inventor's name as "Willibald Kraus". The international publication, however, listed the inventor's name is listed as "Willi Kraus".

Applicant submits that "Willi" is his nickname or abbreviation of his actual surname of "Willibald".

The applicant has obtained many U.S. patents which were filed using his formal surname "Willibald" and which have issued in that way. To that end, submitted herewith are copies of two (2) of Declarations executed by Mr. Kraus and U.S. patents which issued based on those Declarations including:

- 1) US Patent No. 6,115,888; and,
- 2) U.S. Patent No. 6,336,768

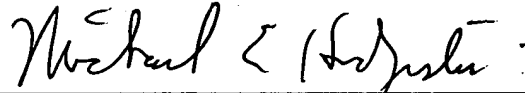
showing that "Willibald" Kraus is the inventor's legal name.

Upon information believed to be true, "Willibald" Kraus and "Willi" Kraus are indeed the same person.

No fees are believed to be due. However, please charge any and all fees that may be necessary to Deposit Account No. 06-0308.

Respectfully submitted,

FAY, SHARPE, FAGAN,
MINNICH & McKEE, LLP



Michael E. Hudzinski, Reg. No. 34,185
1100 Superior Avenue, Seventh Floor
Cleveland, OH 44114-2579
216-861-5582

23 SEP 05
Date



US006336768B1

(12) **United States Patent**
Kraus

(10) **Patent No.:** **US 6,336,768 B1**
(45) **Date of Patent:** **Jan. 8, 2002**

(54) **CONNECTION UNIT WITH ELASTIC FLANGE SEAL BETWEEN CONNECTOR PORTIONS AND SEAL RING FOR ENGAGING AN ASSOCIATED SUPPORT SURFACE**

(75) **Inventor:** Willibald Kraus, Grünstadt (DE)

(73) **Assignee:** TRW Automotive Electronics & Components GmbH & Co. KG (DE)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 09/529,378

(22) **PCT Filed:** Oct. 14, 1998

(86) **PCT No.:** PCT/DE98/03019

§ 371 Date: Jun. 8, 2000

§ 102(e) Date: Jun. 8, 2000

(87) **PCT Pub. No.:** WO99/20907

PCT Pub. Date: Apr. 29, 1999

(30) **Foreign Application Priority Data**

Oct. 17, 1997 (DE) 297 18 487 U

(51) **Int. Cl.⁷** F16B 21/08

(52) **U.S. Cl.** 403/408.1; 24/297; 24/453; 411/508; 411/510

(58) **Field of Search** 403/408.1, 397, 403/384; 411/510, 451, 48, 60.1, 508, 908; 24/297, 298, 289, 453, 563

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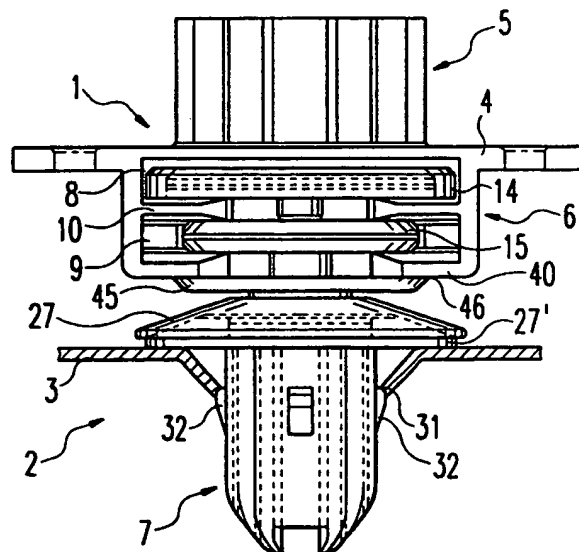
Primary Examiner—Harry C. Kim

(74) *Attorney, Agent, or Firm*—Fay, Sharpe, Fagan, Minnich & McKee, LLP

(57) **ABSTRACT**

The invention relates to a connection unit between a support 3, such as a body part of a motor vehicle, and a plate element, such as the facing of a door. An upper part 1 is attachable to the plate element via an attachment region 5 and an engagement region 6 selectively receives a holding element 2, which is connectable to the support. The engagement region 6 of the upper part 1 consists of two pockets 8, 9, arranged above each other and separated by a cross piece 10. The holding element 2 is equipped, above an attachment region 7, connectable with support 3, with a circumferential elastic sealing lip 27 and two flanges 14, 15 of different elasticity, arranged at axial distance from each other, cross-wise to the longitudinal direction L—L defined by the holding element. The flanges are capable of being inserted into pockets 8, 9, whereby the holding element 2 between the sealing lip 27 and the two flanges 14, 15, presents a third elastic flange 45, which acts upon the outer region of a plate 40 of the lower pocket 9. The sealing lip 27 is equipped on the side facing the support 3 with a circumferential sealing element 27'.

20 Claims, 1 Drawing Sheet



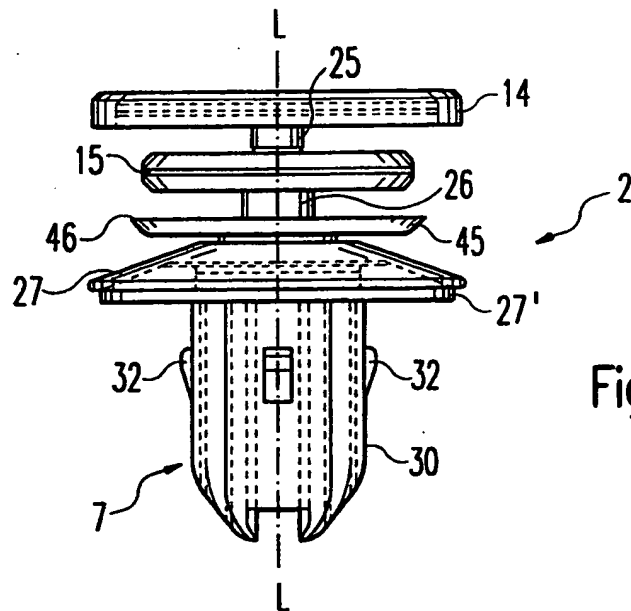


Fig. 1

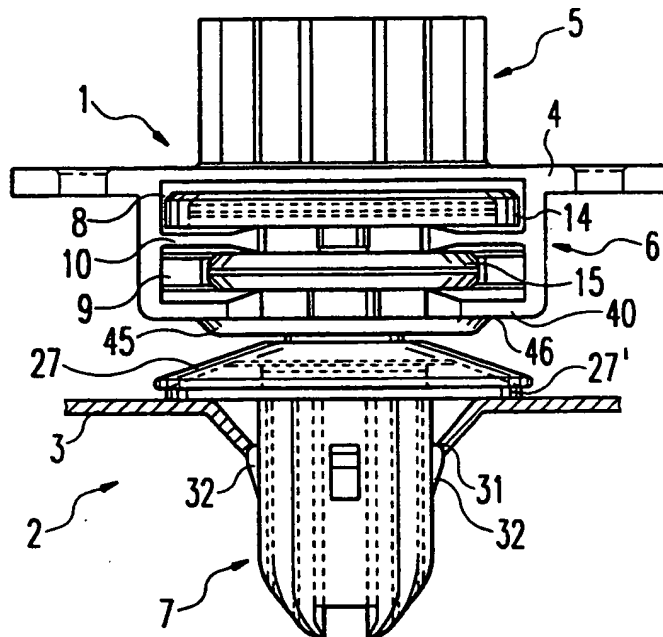


Fig. 2

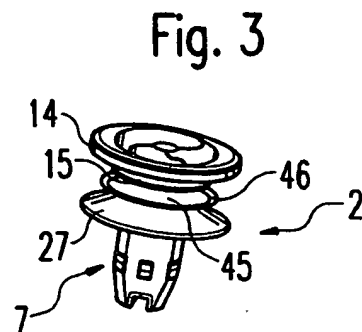


Fig. 3

CONNECTION UNIT WITH ELASTIC FLANGE SEAL BETWEEN CONNECTOR PORTIONS AND SEAL RING FOR ENGAGING AN ASSOCIATED SUPPORT SURFACE

BACKGROUND OF THE INVENTION

The subject invention is directed to the connector art and, more particularly, to a two-piece connector assembly with improved connection and sealing properties.

Connection units of the type under consideration are commonly used in the automotive art to connect plate elements such as molding strips or the like to body parts of a motor vehicle. Typically, the connection units include a holding element portion selectively attachable to an associated support member such as a motor vehicle body part, and an upper portion selectively connectable to a plate element such as automotive door molding, or the like. The holding element and upper portions are selectively connectable to hold the plate element relative to the support member.

A connector of the general type discussed is illustrated in EP 0 726 401 A1. As shown there, a connection element includes a pair of flanges having mutually different elasticities are disposed in an arrangement adjacent a circumferential elastic sealing lip. The pair of flanges are adapted for lateral insertion in a corresponding set of engagement regions formed in pockets of an upper piece portion of the connector. In its mounted position on an associated support element, the circumferential elastic sealing lip of the connection element is adapted to provide a seal against an upper region of the associated support member.

In addition to the above, another valve of the general type discussed is illustrated in DE 40 14 589 C1 whereat a connection element includes an upper piece selectively fastenable to an associated plate element, a middle piece, and a holding element selectively connectable to an associated support element. The construction of the element taught in this disclosure realizes a tolerance compensation which is especially desirable in the automotive industry. More particularly, tolerance compensation along the plane extending in parallel with the associated support member is highly desirable.

Therefore, a two-piece connection assembly of the type discussed including an upper piece and a holding piece that provides both a high degree of mounting accuracy as well as superb sealing between the connection assembly and the associated support member is highly desirable.

SUMMARY OF THE INVENTION

The subject invention provides a connector system for connecting a first associated member such as an automotive trim part with a second associated member such as a motor vehicle body part. The subject connector system includes an outer member having an upper attachment region for selectively joining the outer member with the first associated member, and a holding member having a lower attachment region for selectively joining the holding member with the second associated member. The outer member includes an engagement region formed between the upper attachment region and a lower plate portion and defining first and second pocket regions separated by a cross piece member. The holding member includes a body portion defining a longitudinal axis and carrying a pair of first and second flange members disposed in a relative spaced apart relationship for selective embedded engagement with the first and second pocket regions when the holding member and outer

member are brought into their respective mutual interattached positions.

In accordance with an aspect of the invention, the holding member includes an elastic sealing lip member carrying a circular sealing element positioned to engage the second associated support member when the holding member is attached thereto. Still further, a third elastic flange member is positioned between the second flange member and the elastic sealing lip member for selective engagement with the lower plate portion of the outer member.

One advantage of the above arrangement is a simplification in installation of the subject connector system and, additionally, accurate seating of the holding piece in the upper component so that undesirable motion between the components is avoided. Moreover, the sealing element provides a sealing function between the associated support member and the holding member embedded in an opening therein.

In accordance with a further aspect of the invention, the third flange includes, at an outer circumference thereof, a circumferential sealing ring oriented toward the outer region of the plate member to engage a lower surface of the plate member. This results in the benefit of accurate improved accuracy of placement and locating of the upper component at the engagement region.

In accordance with yet another aspect of the invention, the diameter of the third flange is smaller than the diameter of the first flange and larger than the diameter of the second flange.

In accordance with yet another aspect of the invention, the sealing element is formed as a foamed plastic body. Preferably, the sealing element and the sealing lip are manufactured using a two-component injection molding process. In addition, the sealing element is alternatively formed as a circumferential elastic ring to assure improved sealing between the holding member and the associated support aperture.

As can be seen from the foregoing, a primary object of the invention is the provision of a connector system which enables precise relative positioning of the associated parts forming the connector system and, additionally, provides improved sealing between the connector system and an associated support member.

Still other aspects, advantages, and benefits the invention will become apparent to those skilled in the art upon a reading and understanding of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention may take physical form in certain parts and arrangements of parts, a preferred embodiment of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof, and wherein:

FIG. 1 is a side elevational view of a holding element formed in accordance with the present invention;

FIG. 2 is a side elevational view illustrating the preferred connection of an upper component with the holding element shown in FIG. 1; and,

FIG. 3 is a perspective view of the holding element shown in FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings wherein the showings are for the purposes of illustrating the preferred embodiment of

the invention only and not for purposes of limiting same, the overall arrangement of the preferred form of a holding element 2 can best be seen with reference to FIGS. 1 and 3. As shown there, the holding element 2 comprises, in essence, a lower attachment region 7, an elastic sealing lip 27 arranged above the lower attachment region 7, and a set of three flange members 45, 15, and 14. An attachment or connection neck 25 is provided on the holding element 2 between the first and second flange members 14 and 15 as shown. In addition, an attachment neck 26 is provided between the second flange 15 and the third elastic flange member 45.

In its preferred form, the attachment region 7 is fashioned as an anchor or cylindrical foot-type arrangement 30 provided with elastic locking elements 32. In accordance with the location of the attachment necks 25, 26 on the holding member 2, the first and second flange members 14 and 15 are disposed on the holding member 2 in a spaced apart relationship along a longitudinal axis L—L generally defined by the body of the holding member 2. The third elastic flange member 45 is disposed in a close adjacent relationship to the elastic sealing lip 27 and preferably includes a circumferential sealing ring 46 at its outer circumference.

In accordance with the preferred form of the holding member 2, the diameter of the third flange 45 is smaller than the diameter of the first flange 14 and, further, is greater than the diameter of the second flange 15.

With continued reference to FIG. 1, a further sealing element 27' is provided on the underside of the sealing lip member 27. Preferably, the sealing element 27' is formed from a foamed plastic body in the shape of a ring. Based on this construction, in accordance with the present invention, the sealing lip, together with the pair of flanges and, additionally, together with the sealing element 27' having a foamed plastic body are produced using a two-component injection molding process.

As can be further seen with reference particularly to FIG. 1, the upper flange 14 has a larger diameter than the lower flange 15. Further, the lower connection neck 26 has a larger diameter than the upper connection neck 25. Preferably, however, both of the attachment or connection necks 25, 26 have a substantially overall cylindrical form for selective connection with the upper components in a manner to be described below.

With reference next to FIG. 2, the upper component 1 is shown in a mounted position relative to the lower holding member 2. The upper connection component 1 includes an attachment region 5 which may take on any shape or form as desired for attachment to an associated member such as an automotive molding member, or the like. Further, the upper component 1 includes an attachment region 6 which, preferably, has a rectangular form and is provided with first and second pocket regions 8, 9 separated from each other by a cross piece 10. The lower pocket 9 terminates at a lower plate portion 40.

The cross piece 10 and the lower plate portion 40 each preferably include an insertion slot (not shown) adapted to receive the connection necks 25 and 26 of the holding component 2 represented in FIG. 1. Preferably, the insertion slots include a first insertion guide region formed in the shape of a cone to help guide the connection necks toward the central region of the upper component. Therebeyond, at the central region of the upper component 1, locating apertures having a larger diameter are provided so that, upon lateral insertion of the holding component 2 into the upper component 1, simple and positive interconnection is achieved.

In the relative mounted position between the outer member 1 and the holding member 2, the pair of flanges 14 and 15 are each respectively received within the first and second pocket regions 8 and 9. Additionally, the third elastic flange member 45 is formed to act upon the outer region of the lower plate portion 40 thereby further assuring an accurate seating of the holding element 2 withing the upper component 1.

Still further, as shown in FIG. 1, the sealing ring 46 of the third elastic flange member 45 is adapted to act upon the outer region of the lower plate portion 40 and, thus, further produces a sealing effect.

Additionally, as further shown in FIG. 2, following completed installation of the holding element 2 into the outer member 1, the lower attachment region 7 of the holding member 2 is preferably inserted into an aperture 31 of an associated support member 3. A set of resilient locking elements 32 preferably engage behind latch portions formed by the support member 3 and extending into the aperture 31 to ensure positive attachment of the lower attachment region 3 relative to the associated support member 3.

In the installed position shown in FIG. 2, the sealing element 27' engages the upper side surface of the support member 3 to realize sealing relative to the support aperture 31. Preferably, the sealing element 27' is formed as a foamed plastic body and, accordingly, provides excellent sealing properties.

In accordance with one significant aspect of the invention, by providing a third elastic flange member 45 in a manner substantially as shown, particularly, outside from the first and second pocket regions 8 and 9 of the upper component 1, relative positioning accuracy between the holding member and upper member is realized. Further, in accordance with another important aspect of the invention, the sealing element 27' carried on the elastic sealing lip member 27 provides improved sealing of the holding member 2 relative to the aperture 31 of the associated support member 3.

The invention has been described with reference to the preferred embodiment. Obviously, modifications and alterations will occur to others upon a reading and understanding of this specification. It is intended to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

What is claimed is:

1. A connection unit for use between an associated support and an associated plate element, the connection unit comprising:

an upper part attachable to the plate element via an attachment region and a holding element including an engagement region which is connectable with the support, wherein the engagement region of the upper part consists of two pockets arranged above each other and separated by a cross piece and wherein the holding element is equipped above an attachment region connectable with the support with a circumferential elastic sealing lip and with two flanges having different elasticity, arranged at an axial distance from each other, relative to a longitudinal axis defined by the holding element, the flanges being positioned for insertion into said pockets when the upper part is connected with the holding element following relative motion between the upper part and the holding element in a direction cross-wise to the longitudinal axis, the holding element including a third elastic flange disposed between the sealing lip and the two flanges which acts upon an outer region of a plate of the lower pocket, the sealing lip

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being provided on a side facing the support with a circumferential sealing element.

2. The connection unit according to claim 1 wherein said third flange carries an outer circumferential sealing ring oriented towards said outer region of said lower plate member.

3. The connection unit according to claim 1 wherein a diameter of said third flange is smaller than a diameter of said first flange and greater than a diameter of the second flange.

4. The connection unit according to claim 1 wherein said sealing element is foamed plastic.

5. The connection unit according to claim 4 wherein said sealing element and said sealing lip are manufactured by a two-component injection molding process.

6. The connection unit according to claim 4 wherein said sealing element is formed as a ring.

7. A connector system for connecting a first associated member with a second associated member, the connector system comprising:

an outer member having an upper attachment region for selectively joining the outer member with the first associated member, the outer member including an engagement region formed between the upper attachment region and a lower plate portion, the engagement region defining first and second pocket regions separated by a cross piece member; and,

a holding member having a lower attachment region for selectively joining the holding member with the second associated member and having an elastic sealing lip member carrying a circumferential sealing element positioned to engage the second associated member when the holding member is joined with the second associated member, the holding member including a body portion defining a longitudinal axis, and carrying a pair of first and second flange members disposed in a relative spaced apart relationship for selective embedded engagement with said first and second pocket regions when the outer member and the holding member are brought together in a direction transverse said longitudinal axis, the holding member further including a third elastic flange member positioned between the second flange member and the elastic sealing lip member for selective engagement with said lower plate member when the holding member is joined with the second associated member.

8. The connector system according to claim 7 wherein the first and second flange members have mutually different elasticities.

9. The connector system according to claim 7 wherein the third elastic flange member carries an outer circumferential sealing ring adapted to engage an outer region of the lower plate portion when the outer member and the holding member are brought together in said direction transverse said longitudinal axis.

10. The connector system according to claim 7 wherein: a diameter of the third elastic flange member is less than a diameter of the first flange member; and,

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the diameter of the third elastic flange member is greater than a diameter of the second flange member.

11. The connector system according to claim 7 wherein the circumferential sealing element is a foamed elastic body member.

12. The connector system according to claim 7 wherein the circumferential sealing element and the elastic sealing lip member are formed using a two-component injection molding process.

13. The connector system according to claim 7 wherein the circumferential sealing element is ring shaped.

14. A holding element for use in a two-piece connection system including an outer member including an engagement region having a lower plate portion and defining first and second pocket connection regions separated by a cross piece member, the holding element comprising:

a lower attachment region for selectively joining the holding member with an associated support member; an elastic sealing lip member positioned to engage the associated support member when the holding element is selectively joined with the associated support member;

a body portion defining a longitudinal axis and carrying a pair of first and second flange members disposed in a relative spaced apart relationship for selective embedded attachment with said first and second pocket connection regions when the holding element and the outer member are brought together in a direction transverse said longitudinal axis; and,

a third elastic flange member positioned between the second flange member and the elastic sealing lip member for selective engagement with the lower plate portion when the outer member is joined with the holding member.

15. The holding element according to claim 14 wherein the first and second flange members have mutually different elasticities.

16. The holding element according to claim 14 wherein the third elastic flange member carries an outer circumferential sealing ring adapted to engage the lower plate portion when the outer member and the holding member are selectively attached.

17. The holding element according to claim 14 wherein: the third elastic flange member defines a diameter less than a diameter of the first flange member; and, the diameter of the third elastic flange member is greater than a diameter of the second flange member.

18. The holding element according to claim 14 wherein the elastic sealing lip member is a foamed elastic body member.

19. The holding element according to claim 18 wherein the circumferential sealing element and the elastic sealing lip member are formed using a two-component injection molding process.

20. The holding element according to claim 14 wherein the elastic sealing lip member is ring shaped.

* * * * *

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am an original, first, and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

CONNECTION UNIT WITH ELASTIC FLANGE SEAL BETWEEN CONNECTOR PORTIONS AND SEAL RING FOR ENGAGING AN ASSOCIATED SUPPORT SURFACE (As Amended)

the specification of which was filed together with a Preliminary Amendment and Voluntary Submission of Substitute Specification on April 12, 2000 and accorded serial no. 09/529,378.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37 Code of Federal Regulations § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Germany DE 297 18 487.3 Filed October 17, 1997

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Not applicable.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

PCT Application No. PCT/DE98/03019, Filed October 14, 1998

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Steven M. Auvil, Reg. No. 40,492
Mark E. Bandy, Reg. No. 35,788
Brian G. Bembenick, Reg. No. 41,463
John P. Cornely, Reg. No. 41,687
Joseph D. Dreher, Reg. No. 37,123
Christopher B. Fagan, Reg. No. 22,987
Jude A. Fry, Reg. No. 38,340
Steven M. Haas, Reg. No. 37,841
W. Scott Harders, Reg. No. 42,629
Michael E. Hudzinski, Reg. No. 34,185
Richard M. Klein, Reg. No. 33,000
Thomas E. Kocovsky, Jr., Reg. No. 28,383

Sandra M. Koenig, Reg. No. 33,722
Brian E. Kondas, Reg. No. 40,685
Scott A. McCollister, Reg. No. 33,961
James W. McKee, Reg. No. 26,482
Richard J. Minnich, Reg. No. 24,175
Jay F. Moldovanyi, Reg. No. 29,678
Philip J. Moy, Reg. No. 31,280
Timothy E. Nauman, Reg. No. 32,283
Patrick R. Roche, Reg. No. 29,580
Albert P. Sharpe, III, Reg. No. 19,879
R. Scott Speroff, Reg. No. 37,450
Mark S. Svat, Reg. No. 34,261

Direct all telephone calls to: James W. McKee at telephone number: (216) 861-5582.

Address all correspondence to:

FAY, SHARPE, FAGAN, MINNICH & MCKEE, LLP
1100 Superior Avenue - 7th Floor
Cleveland, Ohio 44114-2518

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may

jeopardize the validity of the application or any patent issued thereon.

Full name of sole inventor: Willibald KRAUS

Inventor's signature



Date: 19.05.00

Residence: 67269 Grünstadt, Germany

Citizenship: GERMANY

Post Office Address:

Theodor-Stormstr. 21A
67269 Grünstadt
GERMANY



US006115888A

United States Patent [19]**Kraus**[11] **Patent Number:** **6,115,888**[45] **Date of Patent:** **Sep. 12, 2000**[54] **PLASTIC HOLDING STRAP**24 02 289 11/1975 Germany
295 15 493 2/1996 Germany[75] Inventor: **Willibald Kraus**, Grünstadt, Germany[73] Assignee: **TRW Automotive Electronics & Components GmbH & Co. KG**, Germany

Primary Examiner—Victor N. Sakran

Attorney, Agent, or Firm—Fay, Sharpe, Fagan, Minnich & McKee, LLP

[21] Appl. No.: **09/245,004**[22] Filed: **Feb. 4, 1999**[30] **Foreign Application Priority Data**

Feb. 4, 1998 [DE] Germany 198 04 357

[51] Int. Cl.⁷ **B65D 63/00; F16L 3/00**[52] U.S. Cl. **24/16 PB; 24/17 AP; 24/30.5 P**[58] Field of Search **24/16 PB, 17 AP, 24/30.5 P, 297; 248/74.3**[56] **References Cited****U.S. PATENT DOCUMENTS**

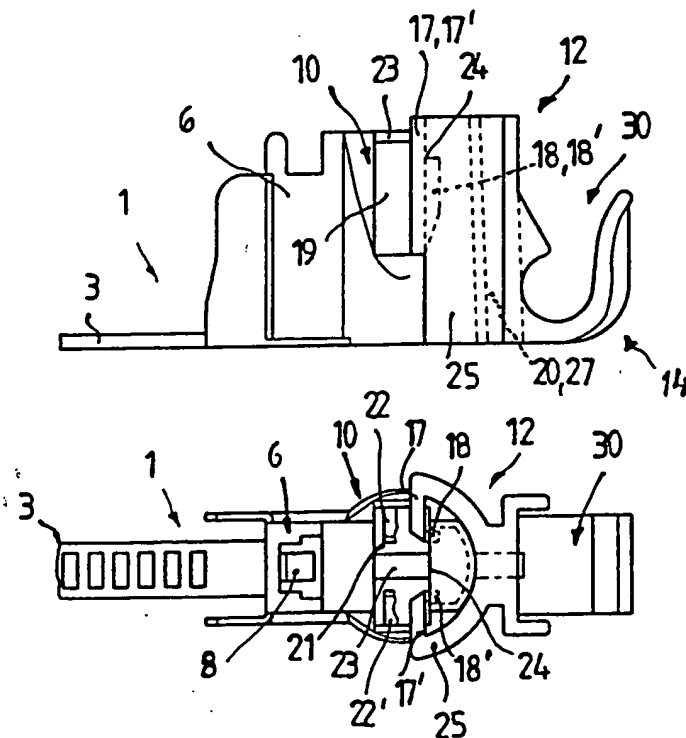
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20 Claims, 2 Drawing Sheets[57] **ABSTRACT**

A plastic holding strap is provided for bundling elongate objects and fastening the elongate bundled objects to an associated support member. The holding strap includes a first holding element adapted for connection onto the associated support member. An elongate profiled strap element extends from the first holding element for encircling and fastening a first bundle of associated elongate objects onto the holding element for connection in turn to an associated support member. In order to provide additional holding capability and to enable a wider range of application of the plastic holding strap, a second holding element is provided for selective intermatable attachment onto the first holding element. The second holding element defines at least one receiving area for selective connection to one or more associated articles in addition to the items fastened to the first holding element. Preferably, the at least one receiving area is formed in the shape of a resilient clip and alternatively includes a plurality of spaced-apart resilient clips for parallel attachment of additional associated articles to the second holding element. The second holding element provides supplemental holding capability to carry objects in addition to the items bundled by the strap element of the first holding element.



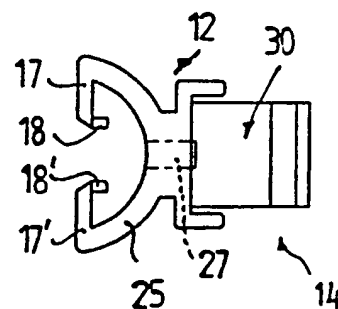
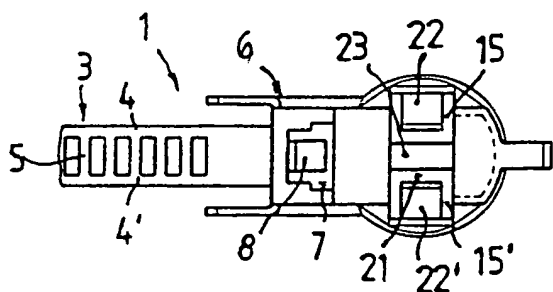
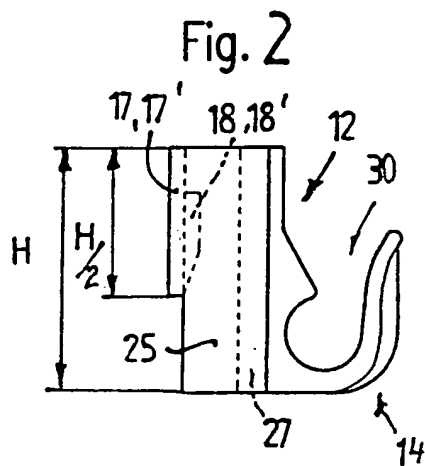
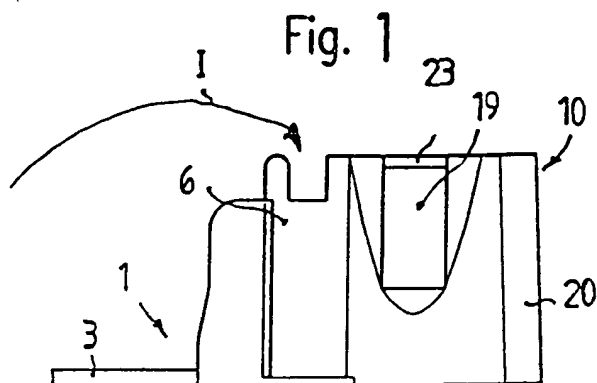


Fig. 3

Fig. 4

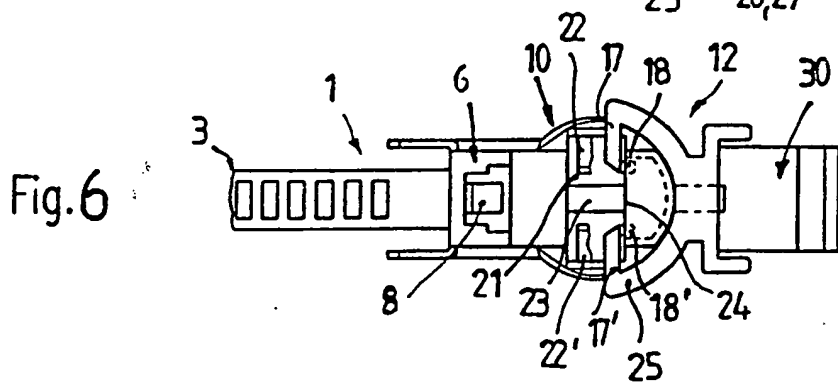
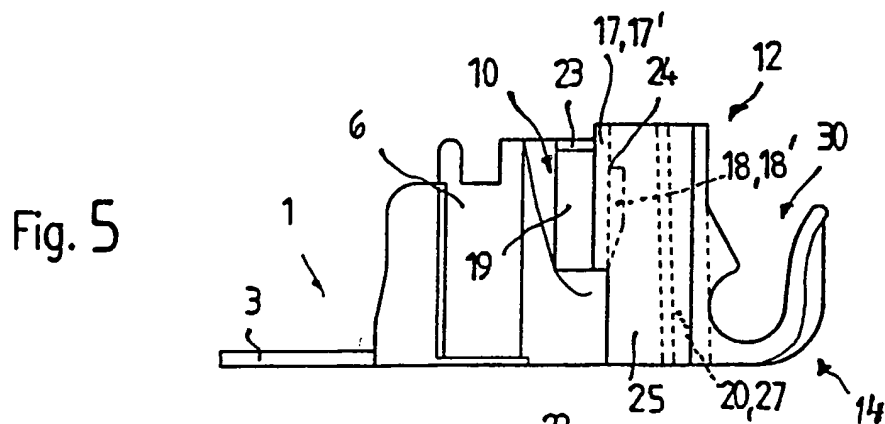


Fig. 7

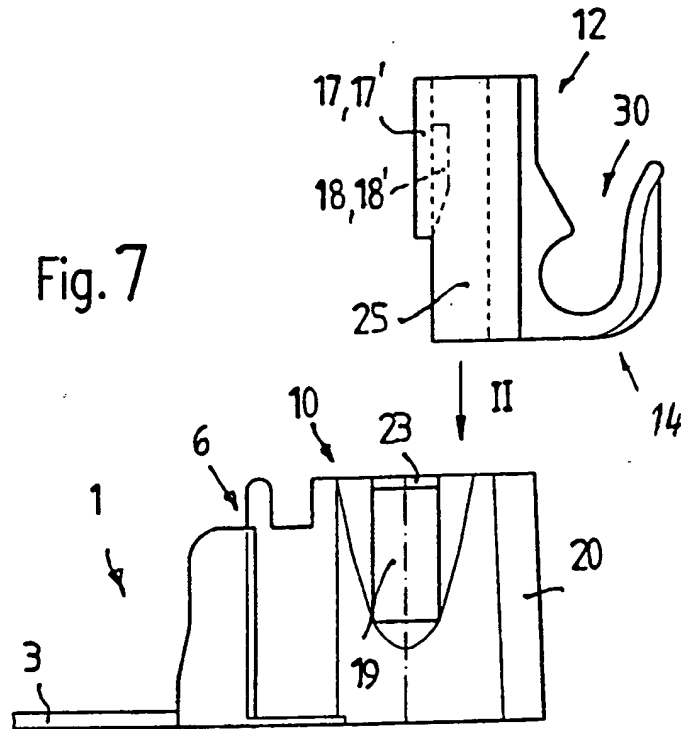
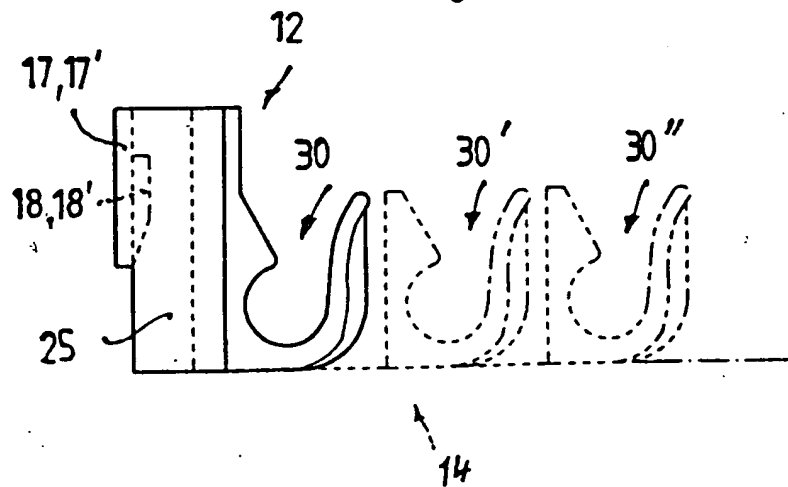


Fig. 8



PLASTIC HOLDING STRAP

BACKGROUND OF THE INVENTION

The subject invention is directed to the art of plastic holding straps of the type used for looping around, fastening, and bundling cables and other tubular articles to an associated support member and, more particularly, to the art of plastic holding elements of the type including a holding element body adapted for connection onto associated support members.

Plastic holding straps of the type under consideration are commonly used to bundle cables and other elongate objects such as tubes or the like in a secured manner. Typically, the plastic holding straps are formed as a long relatively thin flexible profiled strap element including a pair of spaced apart parallel longitudinal strips that extend along the length of the strap element. A plurality of transverse rung members extend in a spaced apart relationship between the pair of parallel longitudinal strips. One end of the plastic holding element defines a passage opening adapted to accept the other free end of the holding strap therethrough. At least one elastic locking element is disposed within the passage opening for engaging the plurality of transverse rung members. The elastic locking element is typically embedable relative to the longitudinal strips and transverse rung members. Some plastic holding straps provide means for connection onto an associated support member.

Holding straps of the type described above are well known in the art. A number of patents including U.S. Pat. No. 3,991,444, and German Patents DE-GM 297 07 757.0 and DE-OS 38 07 173 describe a plastic holding strap that includes a strap element that is selectively insertable into a head piece. The head piece is in turn selectively connectable with a support either prior to or after the strap element is inserted into the head piece.

Another form of plastic holding strap includes a holding element disposed immediately beneath the head piece. In that type of holding strap, the holding element disposed beneath the head piece is selectively connectable with an associated support.

All of the prior plastic holding strap constructions including the aforementioned straps have in common the feature that the elongate tubes or cables are secured after looping and fixing the strap component into place in the head or body member. After the strap is secured in place within the body member, the holding strap has fulfilled its function. No additional tubes or cables can be accommodated.

It would be desirable, therefore, to provide a plastic holding strap that is capable of a wider application range beyond simply encircling and bundling a single group of elongate tubular objects, cables, and the like. It is often desirable to fasten an additional second group of tubes, cables, or other articles onto a plastic holding strap that is already secured around a first group of elongate tubular objects.

SUMMARY OF THE INVENTION

The subject invention provides a plastic holding strap that includes an auxiliary holding element body that is adapted for selective intermatable attachment onto a holding element body for providing auxiliary or supplemental holding capability to a strap that has been previously loaded with a bundle of tubular objects. Preferably, the auxiliary holding element defines at least one receiving area for selective connection to an associated article. The at least one receiv-

ing area of the auxiliary holding element enables the plastic holding strap to be used for fastening additional tubes, cables, or other elements to an operatively support member when the auxiliary holding element is clipped onto the primary holding element associated with the elongate holding strap. Accordingly, the range of applications of the plastic holding strap is selectively broadened or expanded by selectively clipping the auxiliary holding element with the at least one receiving area onto the primary holding element. The auxiliary holding element is connected to the primary holding element in a simple fashion.

In accordance with a more limited aspect of the invention, the auxiliary holding element is adapted to be clipped onto at least one area of the primary holding element. More particularly, the auxiliary holding element includes at least one embedable strip member extending therefrom and adapted to clip into a corresponding at least one recess formed in the primary holding element. To enable a positive connection, the auxiliary holding element includes a pair of opposing embedable strip members for connection into a corresponding set of opposing recesses formed in the primary holding element.

In accordance with yet a further limited aspect of the invention, the primary holding element is shaped in the form of truncated cone and defines an interior longitudinal opening therethrough. At least one longitudinal rib element extends radially outwardly from the body of the primary holding element for engagement with a corresponding longitudinal alignment recess defined in the auxiliary holding element. The combination of the interaction between the pair of opposing embedable strip members and the pair of opposing recesses together with the longitudinal rib element and alignment recess provides a simple, yet effective, fastening capability between the auxiliary holding element and the primary holding element.

To further provide for secure fastening between the components, the pair of opposing embedable strip members are provided on each end with a longitudinal rib extending outwardly from the strip members. The longitudinal ribs extending from the strip members are adapted to grip behind an upper edge of the interior opening defined in the primary holding element when the auxiliary holding element is fastened onto the primary holding element. The interaction between the longitudinal rib with the back surface of the upper edge of the interior opening ensures a functionally secure connection between the components in an assembled state. Further, the interaction between the longitudinal ribs and the back surface of the upper edge of the interior opening, together with the longitudinal alignment rib and longitudinal alignment recess, prevents accidental separation of the auxiliary holding element from the primary holding element of the subject plastic holding strap.

In accordance with a still further aspect of the invention, at least one storage and/or receiving area is provided on an outer curved surface of the auxiliary holding element. By locating the storage and/or receiving area on the outer curved surface of the dish-shaped area of the auxiliary holding element, several storage and/or receiving areas are selectively sequentially arranged in a direction extending from the primary holding element so that several cables or tubes can be connected onto the auxiliary holding element in a parallel arrangement. Alternatively, the present invention enables the storage and/or receiving areas to be formed in an arbitrary manner in correspondence with the particular type of tube or other associated item to be held thereby. That is, the connection area is adaptable in form and function to accommodate any type item to be held.

In accordance with a still further aspect of the invention, the auxiliary holding element has a longitudinal height that is substantially equivalent to the longitudinal height of the primary holding element, whereby the pair of embedable strip members are respectively clipped into the upper part of the passage opening and pair of recesses formed in the primary holding element. More particularly, the pair of embedable strip members are formed to extend about half the height of the auxiliary holding element.

As can be seen from the foregoing, a primary object of the invention is the provision of a holding strap system that is readily expandable for fastening additional tubes or cables onto a bundled set of elongate objects. The system includes a first holding element and a second or additional holding element.

A further object of the invention is the provision of an auxiliary holding element provided with at least one receiving area for selective connection to an associated article. The auxiliary holding element is selectively connectable to a primary holding element that includes an elongate profiled strap element for bundling a set of elongate objects.

A further object of the invention is the provision of an auxiliary holding element adapted for selected intermatably attachment onto the primary holding element, the auxiliary element defining a plurality of receiving areas for selective connection to an associated plurality of articles.

Still other advantages and benefits of the invention will become apparent to those skilled in the art upon a reading and understanding of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention may take physical form in certain parts and arrangements of parts, the preferred embodiments of which will be described in detail in this specification and illustrate in the accompanying drawings which form a part hereof, and wherein:

FIG. 1 is a side elevational view of the primary holding element component formed in accordance with the present invention;

FIG. 2 is a side elevational view of the auxiliary holding element formed in accordance with the present invention;

FIG. 3 is a top plan view of the primary holding element shown in FIG. 1;

FIG. 4 is a top plan view of the auxiliary holding element shown in FIG. 2;

FIG. 5 is a side elevational view of the two main component shown in FIGS. 1 and 2 joined in their assembled condition;

FIG. 6 is a top plan view of the assembled components shown in FIG. 5;

FIG. 7 is a side elevational view of the two main components shown in FIGS. 1 and 2 in aligned relationship prior to being moved to their assembled condition shown in FIGS. 5 and 6; and,

FIG. 8 is a side elevational view of an alternative embodiment of the auxiliary holding element shown in FIG. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings wherein the showings are for the purposes of illustrating the preferred embodiments of the invention only and not for purposes of limiting same, the FIG.s show a holding strap system 1 for fastening a bundle of elongate objects to an associated support member, the

holding strap system 1 being formed from a first component including a first, or primary, holding element 10 and a second component including a second, or auxiliary, holding element 12. The first holding element 10 is shown in FIGS. 1 and 3. The auxiliary holding element is shown in FIGS. 2 and 4. In accordance with the present invention, the primary and auxiliary holding elements 10, 12 are selectively connectable as shown in FIGS. 5 and 6. FIG. 7 illustrates the two main components in aligned relationship just prior to being moved into their assembled or connected condition shown in FIGS. 5 and 6. The auxiliary holding element 12 adds an additional range of holding capabilities to the primary holding element 10 by providing one or more storage clips 30, 30', 30" in a storage and/or receiving area 14. By merely clipping the auxiliary holding element 12 onto the body of the primary holding element 10, additional tubes or other associated objects can be fastened to a support member quickly and easily.

With particular reference now to FIGS. 1 and 3, the primary holding element 10 is shown in side and top views respectively. The primary holding element is adapted to loop around, fasten, or otherwise bundle a set of associated articles (not shown) such as, for example, tubes, cables, or other elongate objects. The primary holding element 10 of the subject holding strap 1 system includes an elongate profiled strap element 3 connected to the holding element body 10. The elongate profiled strap element includes a pair of spaced apart parallel longitudinal strips 4, 4' and set of transverse rung members 5 extending between the pair of longitudinal strips 4, 4'. A head member 6 is connected to the holding element body 10 as shown. The head member 6 defines at least one passage opening 7 adapted to selectively receive a free end of the elongate profiled strap element 3 therethrough. At least one elastic locking element 8 is disposed on the holding element 10 extending into the at least one passage opening 7 for selectively engaging the set of transverse rung members 5 of the elongate strap element 3. The at least one elastic locking element 8 is operative to hold the elongate profiled strap element 3 in place relative to the head member 6.

In use, the elongate profiled strap element 3 is looped around a group of articles to fasten or otherwise bundle the articles onto the holding element 10. The strap element 3 is first looped around the articles and then the free end of the strap is inserted in the direction of arrow I into the passage opening 7 of the head member 6. There, the strap element 3 engages the elastic locking element 8 to tightly bundle the associated objects in place. Preferably, the locking element 8 permits unidirectional movement of the strap to enable only tightening of the strap around the articles while preventing loosening.

As is apparent from FIGS. 1 and 3, the holding element 10 together with the head member 6 are adapted to be joined onto an associated support member (not shown). With respect to the preferred embodiment of the invention shown in the drawings, the holding element 10 is formed in the shape of truncated cone and has at least one longitudinal rib element 20 formed on the outer circumference of the holding element extending outwardly on a side opposite from the elongate profiled strap element 3. Preferably, the longitudinal rib element 20 is disposed in a longitudinal direction and extends radially outwardly from the holding element as best shown in FIG. 3.

In addition to the above, an interior opening 21 is provided in the primary holding element 10. The interior opening 21 extends longitudinally through the holding element 10 substantially completely therethrough but is limited

in its upper region by a strip member 23. In addition to the strip member 23, a pair of inwardly oriented opposing resilient tongue members 22, 22' are provided in the interior opening 21. The pair of resilient tongue members are adapted to be embedded into threads or grooves formed in a bolt or stud member joined to an associated support member (not shown) for mounting the holding element 10 onto the support member. Still further in connection with the interior longitudinal opening 21, a transverse opening 19 is provided as shown in FIG. 1. The transverse opening 19 extends cross-wise through the holding element 10 in an upper region thereof. As will be described below, the transverse opening 19 is used when the auxiliary holding element 12 is clipped onto the primary holding element 10.

As noted above, in accordance with the present invention, an additional element 12 can be selectively connected onto the primary holding element 10 of the subject plastic holding strap 1. The second holding element 12 is shown in FIGS. 2 and 4 in side and top views respectively. Of particular importance, the auxiliary holding element 12 includes at least one storage and/or receiving area 14 for receiving or clipping onto an associated tubular object (not shown). It is an advantage of the present invention that the auxiliary holding element 12 can be selectively clipped into an area of the primary holding element 10. In that regard, in order to fasten the additional element 12 onto the primary holding element 10, a set of recesses 15, 15' and embedable strip members 17, 17' are respectively provided on the main holding element 10 and the auxiliary holding element 12. Preferably, a pair of opposing recesses 15, 15' are provided in the holding element 10 (FIG. 3) and a corresponding pair of opposing embedable strip members 17, 17' are formed on the second holding element 12 (FIG. 4).

As shown best in FIG. 3, the pair of recesses 15, 15' are formed as part of the interior longitudinal opening 21 and, in that regard, are formed contiguously therewith. In FIGS. 4 and 6, the pair of embedable strip members 17, 17' are shown arranged on an end region of a dish or cylindrically shaped area 25 of the auxiliary holding element 12. The dish area 25 includes a central longitudinal alignment recess 27 shown best in FIGS. 4 and 6. The central recess 27 is adapted to receive a corresponding longitudinal guide rib 20 extending radially outwardly from the holding element 10 as shown in FIGS. 1 and 3.

As shown in FIG. 4, the pair of opposing embedable strip members 17, 17' each have, respectively, on their end regions, a longitudinal rib member 18, 18'. The longitudinal rib members 18, 18' are adapted to engage beneath an upper edge of the inner opening 21 of the holding element 10 when the auxiliary holding element 12 is connected onto the holding element 10 shown best in FIG. 5 and 6.

As shown in FIGS. 1 and 2, the additional holding element 12 has substantially the same height H as the primary holding element 10. Further as shown there, the pair of embedable strip members 17, 17' extend downwardly approximately half the height H/2 of the additional element 12. The longitudinal rib members 18, 18' on the longitudinal embedable strip members 17, 17' are shorter than the strip members. Generally, the embedable strip member 17, 17' and the longitudinal ribs 18, 18' are preferably located or otherwise disposed in the upper region of the additional holding element 12.

Turning now to FIG. 7, the first and second holding elements 10, 12 are shown in their aligned relationship prior to being moved together in a direction II toward their connected or assembled condition shown in FIG. 5 and 6. To

join the components together, as shown in FIG. 7, the auxiliary holding element 12 is moved from above in the direction of the arrow II and pushed onto the holding element 10 whereupon the pair of embedable strip members 17, 17' are used initially as a guide. More particularly, the embedable strip members 17, 17' help guide the auxiliary holding element 12 along the primary holding element 10 and into place until the pair of longitudinal ribs 18, 18' engage behind the upper edge 24 (FIGS. 5 and 6) of the primary holding element 10. The longitudinal guide rib 20 also helps guide the first and second holding elements 10, 12 together.

The curvature of the cylindrical or dish-shaped area 25 is advantageously adapted to conform to the outer circumference of the first holding element 10 so that, as shown in FIG. 6, the auxiliary holding element 12 intermatably connects to the first holding element 10 as a "single piece" assembled unit. When the second holding element 12 is intermatably connected with the first holding element 10, the storage and/or receiving area 14 on the second holding element 10 enables additional holding capacity for clipping additional tubes, cables, or other associated objects onto the associated support member and primary holding element.

In the first embodiment of the auxiliary holding element 12 shown in FIGS. 2-7, a single storage dish or clip member 30 is provided for selectively clipping onto associated members. As shown in FIG. 8, however, it is possible to alternatively provide several sequentially arranged storage dishes or clips 30, 30', and 30" for fastening tubes or cables in a spaced apart parallel relationship. Although three dish or clip areas are shown in FIG. 8, four or more can be alternatively provided. Further, other clip-type or connection schemes can be substituted for the dish-shaped clips 30, 30', 30" such as, for example, in the form of cones or holding regions so that additional non tubular shaped components having irregular shapes or the like can be fastened using the subject plastic holding strap 1 via specialized additional elements 12. Overall, the application range of the subject holding strap system 1 is expanded by the diverse possibilities for clips, holding regions, or connecting areas formed on the auxiliary holding element 12.

The invention has been described with reference to the preferred embodiments. Obviously, modifications and alterations will occur to others upon a reading and understanding of this specification. It is intended to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

Having thus described the invention, it is claimed:

1. A plastic holding strap for use in bundling objects and fastening the bundled objects to an associated support member, the holding strap comprising:

a holding element selectively connectable onto the associated support member;

an elongate profiled strap element connected to the holding element, the elongate profiled strap element including a pair of spaced apart parallel longitudinal strips and a set of transverse rung members extending between the pair of parallel longitudinal strips;

a head member connected to the holding element and to a first end of the elongate profiled strap element, the head member defining at least one passage opening adapted to selectively receive a second free end of the elongate profiled strap element therethrough;

at least one elastic locking element extending into the at least one passage opening for selectively engaging said set of transverse rung members to hold the elongate

profiled strap element in place relative to the head member; and,

an auxiliary holding element selectively intermatable with the holding element, the auxiliary holding element defining at least one receiving area for selective connection to an associated article, and including at least one dish shaped storage member for connecting an associated elongate article to the auxiliary holding element.

2. The plastic holding strap according to claim 1 wherein; the auxiliary holding element and the holding element are adapted selectively clip together; and,

the auxiliary holding element includes a plurality of dish-shaped storage members for connecting a plurality of associated elongate articles to the auxiliary holding element.

3. A plastic holding strap for use in bundling objects and fastening the bundled objects to an associated support member, the holding strap comprising:

- a holding element selectively connectable onto the associated support member;
- an elongate profiled strap element connected to the holding element, the elongate profiled strap element including a pair of spaced apart parallel longitudinal strips and a set of transverse rung members extending between the pair of parallel longitudinal strips;
- a head member connected to the holding element and to a first end of the elongate profiled strap element, the head member defining at least one passage opening for selectively receiving a second free end of the elongate profiled strap element therethrough;
- at least one elastic locking element extending into the at least one passage opening for selectively engaging said set of transverse rung members to hold the elongate profiled strap element in place relative to the head member; and,
- an auxiliary holding element selectively attachable onto the holding element, the auxiliary holding element defining at least one receiving area for selective connection to an associated article, the auxiliary holding element including at least one embedable strip members, the holding element including at least one recess adapted to receive the at least one embedable strip member when the holding element and the auxiliary holding element are selectively attached together.

4. The plastic holding strap according to claim 3 wherein: the auxiliary holding element includes a pair of opposing embedable strip members; and,

the holding element includes a pair of opposing recesses adapted to receive the pair of embedable strip members when the holding element and the auxiliary holding element are selectively clipped together.

5. The plastic holding strap according to claim 4 wherein: the holding element is shaped substantially in the form of a truncated cone and includes a longitudinal rib element extending outwardly from a side of the holding element opposite from said elongate profiled strap element, the holding element defining an interior longitudinal opening extending longitudinally therethrough, the pair of opposing recesses being contiguous with the interior opening; and,

the auxiliary holding element includes a dish shaped area conforming in shape to the truncated cone, the dish shaped area including a longitudinal central recess adapted to receive the longitudinal rib element of the

holding element therein when the auxiliary holding element and the holding element are selectively clipped together, the pair of opposing embedable strip members being carried on opposite ends regions of the dish shaped area for selective engagement with the pair of opposing recesses when the auxiliary holding element and the holding element are selectively clipped together.

6. The plastic holding strap according to claim 5 wherein: the holding element includes an upper lip edge disposed at an upper end of the interior longitudinal opening; and, the pair of opposing embedable strip members include longitudinal engagement ribs adapted to engage the upper lip edge when the auxiliary holding element is intermately connected with the holding element to selectively hold the auxiliary holding element and the holding element connected.

7. The plastic holding strap according to claim 6 wherein the at least one receiving area is disposed on the auxiliary holding element on a side opposite from the dish shaped area.

8. The plastic holding strap according to claim 7 wherein the at least one receiving area comprises at least one of i) a dish shaped storage member adapted to connect an associated elongate article to the auxiliary holding element, and ii) a plurality of dish shaped storage members adapted to connect a plurality of associated elongate articles to the auxiliary holding element.

9. The plastic holding strap according to claim 8 wherein: the auxiliary holding element has a height substantially corresponding to a height of the holding element; and, the pair of opposing embedable strip members on the auxiliary holding element are adapted to selectively engage with an upper portion of the pair of opposing recesses formed in the holding element.

10. The plastic holding strap according to claim 9 wherein the pair of opposing embedable strip members extend over substantially half said height of the auxiliary holding element.

11. The plastic holding strap according to claim wherein the elongate profiled strap element, the head member, and the at least one elastic locking element are formed integrally with said holding element.

12. The plastic holding strap according to claim 11 wherein the auxiliary holding element and the holding element are adapted to selectively clip together.

13. A holding strap system for fastening a bundle of elongate objects to an associated support member, the holding strap system comprising:

- a first holding element adapted for selective connection to the associated support member, the first holding element including:

- an elongate strap element extending from the first holding element and terminating at a free end, the elongate strap element including a pair of spaced-apart parallel longitudinal strips and set of transverse rung members extending between the pair of parallel longitudinal strips;

- a head member defining at least one passage opening adapted to selectively receive the free end of the elongate strap element therethrough; and,

- at least one elastic locking element extending into the at least one passage opening for selectively engaging said set of transverse rung members to hold the elongate profiled strap element in place relative to the head member; and,

- a second holding element selectively slidably connectable with the first holding element, the second hold-

ing element defining at least one clip-like receiving area adapted to selectively clip onto an associated elongate article to hold the article relative to the support member when the second holding element is slidably connected with the first holding element.

14. The holding strap system 1 according to claim 13 wherein the elongate strap element, the head member, and the at least one elastic locking element are formed integrally with the first holding element.

15. A holding strap system for fastening a bundle of elongate objects to an associated support member, the holding strap system comprising:

a first substantially cylindrically shaped holding element selectively connectable to the associated support member, the first holding element including:

an elongate strap element extending from the first holding element and terminating at a free end, the elongate strap element including a pair of spaced-apart parallel longitudinal strips and set of transverse rung members extending between the pair of parallel longitudinal strips;

a head member defining at least one passage opening adapted to selectively receive the free end of the elongate strap element therethrough;

at least one longitudinally extending alignment rib element; and,

at least one elastic locking element extending into the at least one passage opening for selectively engaging said set of transverse run members to hold the elongate profiled strap element in place relative to the head member; and,

a second holding element selectively slidably connectable with the first holding element, the second holding element defining at least one clip-like receiving area adapted to selectively clip onto an associated elongate article to hold the article relative to the support member when the second holding element is slidably connected with the first holding element, the second holding element having a cylindrically shaped area and including at least one alignment recess extending longitudinally relative to the cylindrically shaped area, the at least one alignment recess being shaped to intermatably receive the at least one longitudinally extending alignment rib element when the first and second holding elements are selectively

connected, the elongate strap element, the head member, and the at least one elastic locking element being formed integrally with the first holding element.

16. The holding strap system 1 according to claim 15 wherein at least one of the first holding element and the second holding element includes an embedable strip element for selectively connecting the at least one of the first holding element and the second holding element to the other one of the first holding element and the second holding element; and,

said other one of the first holding element and the second holding element includes a recess adapted to receive the embedable strip element, the recess and the strip element cooperatively selectively connecting the first holding element and the second holding element together.

17. The holding strap system 1 according to claim 16 wherein the second holding element defines a plurality of clip-like receiving areas.

18. The holding strap system 1 according to claim 16 wherein:

the first holding element includes an upper lip edge disposed at an upper end of an interior longitudinal opening through the first holding element; and,

the strip element includes at least one longitudinal engagement rib adapted to engage the upper lip edge when the first and second holding elements are selectively intermatably connected together to selectively hold the second holding element and the first holding element connected.

19. The holding strap system 1 according to claim 16 wherein:

the second holding element has a height substantially corresponding to a height of the first holding element; and,

the embedable strip element is selectively engagable with an upper portion of said recess formed in the first holding element.

20. The holding strap system 1 according to claim 19 wherein the embedable strip element extends over substantially half said height of the second holding element.

* * * * *

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am an original, first, and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

PLASTIC HOLDING STRAP

for which I am about to make application for Letters Patent of the United States, I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37 Code of Federal Regulations § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

GERMANY 198 04 357.0 Filed February 4, 1998

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:
Not applicable.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Not Applicable

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Steven M. Auvil, Reg. No. 40,492
Mark E. Bandy, Reg. No. 35,788
Thomas E. Beall, Jr., Reg. No. 22,410
Brian G. Bembenick, Reg. No. 41,463
John P. Cornely, Reg. No. 41,687
A. John Demarco, Reg. No. 40,586
Joseph D. Dreher, Reg. No. 37,123
Christopher B. Fagan, Reg. No. 22,987
Jude A. Fry, Reg. No. 38,340
Steven M. Haas, Reg. No. 37,841
W. Scott Harders, Reg. No. 42,629
Michael E. Hudzinski, Reg. No. 34,185
Jeffrey M. Ketchum, Reg. No. 31,174
Richard M. Klein, Reg. No. 33,000
Thomas E. Kocovsky, Jr., Reg. No. 28,383

Sandra M. Koenig, Reg. No. 33,722
Brian E. Kondas, Reg. No. 40,685
Scott A. McCollister, Reg. No. 33,961
James W. McKee, Reg. No. 26,482
John R. Mattingly, Reg. No. 30,293
Richard J. Minnich, Reg. No. 24,175
Jay F. Moldovanyi, Reg. No. 29,678
Philip J. Moy, Reg. No. 31,280
Timothy E. Nauman, Reg. No. 32,283
Patrick R. Roche, Reg. No. 29,580
Albert P. Sharpe, III, Reg. No. 19,879
R. Scott Speroff, Reg. No. 37,450
Gene W. Stockman, Reg. No. 21,021
Mark S. Svat, Reg. No. 34,261
John C. Tiernan, Reg. No. 21,078

Direct all telephone calls to: James W. McKee at telephone number:
(216) 861-5582.

Address all correspondence to:

James W. McKee
FAY, SHARPE, BEALL, FAGAN,
MINNICH & MCKEE, LLP
1100 Superior Avenue - 7th Floor
Cleveland, Ohio 44114-2518

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole inventor: Willibald Kraus

Inventor's signature 

Date: 29.01.1999

Residence: 67269 Grünstadt, GERMANY

Citizenship: GERMANY

Post Office Address: Theodor-Stormstr. 21A, 67269 Grünstadt, GERMANY